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मानक

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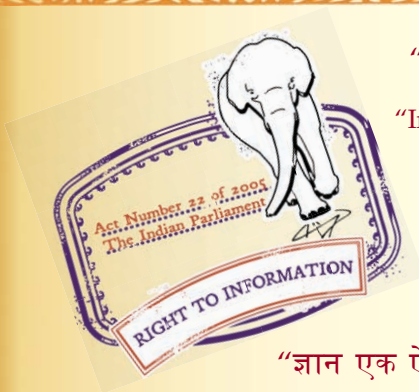
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IS 8507-3-1 (1981): Fixed insulated hermetically sealed tantalum capacitors with solid electrolyte, Part 3: Type FCST 2, Section 1: Polar [LITD 5: Semiconductor and Other Electronic Components and Devices]



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Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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Indian Standard (Reaffirmed 2002)
**SPECIFICATION FOR FIXED, INSULATED,
 HERMETICALLY SEALED TANTALUM CAPACITORS
 WITH SOLID ELECTROLYTE**

**PART III TYPE FCST 2
 Section I Polar**

0. General — This standard shall be read in conjunction with IS : 8507 (Part I) - 1977 'Specification for fixed, insulated, hermetically sealed tantalum capacitors with solid electrolyte : Part I General requirements and methods of test'.

1. Outline Drawing and Dimensions — The outline drawing and dimensions shall be according to Fig. 1 and Table 1.

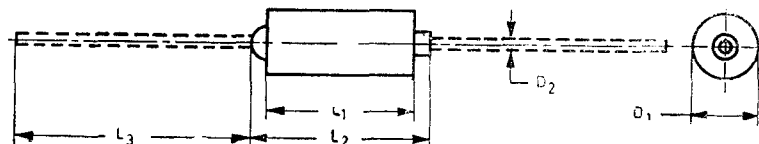


FIG. 1 POLAR SOLID TANTALUM CAPACITOR

Note 1 — The case insulation extends 0.38 mm beyond each end. However, when a shrink fitted insulation is used, it laps over the ends of the capacitor body.

Note 2 — The termination shall consist of tin-lead coated nickel wire.

TABLE 1 DIMENSIONS

Case Size	Dimensions, mm				
	L_1 ± 0.79	L_2 (Max)	L_3 (Min)	D_1 ± 0.41 0.38	D_2
(1)	(2)	(3)	(4)	(5)	(6)
A	7.26	10.72	31.75	3.43	0.50 ± 0.05
B	12.04	15.49	31.75	4.70	0.50 ± 0.05
C	17.42	20.88	31.75	7.34	0.60 ± 0.06 -0.05
D	19.96	23.42	31.75	8.92	0.60 ± 0.06 -0.05

2. Ratings and Characteristics

a) Rated capacitance	see 4.1 of IS : 8507 (Part I) - 1977
b) Selection tolerance	± 5 , ± 10 , ± 20 percent
c) Rated voltage (U_R)	see Table 2
d) Category voltage (U_C)	see Table 2
e) Surge voltage (U_S)	see Table 2
f) Rated temperature	70°C
g) Vibration	10 - 2 000 Hz, 100 m/s ² , 3 × 3 hours
h) Bump	4 000, 400 m/s ²
j) Shock	1 km/s ²
k) Acceleration	1 km/s ²
m) Climatic category	55/85/56 [see Appendix A of IS : 589-1961 'Basic climatic and mechanical durability tests for components for electronic and electrical equipment (revised)'].
n) Low air pressure	2 kPa

Adopted 29 May 1981

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TABLE 2 RATED VOLTAGE (U_R), CATEGORY VOLTAGE (U_C)
AND SURGE VOLTAGE (U_S)

(Clause 2)

U_R (at 70°C) V	U_C (at 85°C) V	U_S (at 70°C) V
(1)	(2)	(3)
6	6	8
10	10	12
15	10	17
20	13	23
25	20	28
35	23	41
50	33	58
75	50	88
100	67	120

3. Marking — See 7 of IS : 8507 (Part I) - 1977.

4. Construction and Workmanship — See 5 of IS : 8507 (Part I) - 1977.

5. Classification of Tests — See 8.1 of IS : 8507 (Part I) - 1977.

5.1 General Conditions for Tests — See 8.2 of IS : 8507 (Part I) - 1977.

5.1.1 The test schedule and requirements shall be in accordance with Table 3.

TABLE 3 TEST SCHEDULE AND REQUIREMENTS

SI No.	Test	Clause Ref in IS : 8507 (Part I)- 1977	Condition of Test	Requirement								
(1)	(2)	(3)	(4)	(5)								
i)	All Samples											
a)	Visual examination	8.4.1	—	The workmanship and finish shall be satisfactory. The marking shall be legible								
b)	Dimensions	8.4.2	—	The dimensions of the capacitors and their terminations shall conform to values given in Table I used with Fig. I								
c)	Capacitance	8.3.2	—	The capacitance value shall correspond with the rated capacitance taking into account the tolerance								
d)	Tangent of loss angle	8.3.3	—	The value shall not exceed: <table><tr><td>Rated Voltage</td><td>Tan δ, Percent</td></tr><tr><td>6.0 & 10 V</td><td>10</td></tr><tr><td>15 & 20 V</td><td>8</td></tr><tr><td>25 & 35 V</td><td>6</td></tr></table>	Rated Voltage	Tan δ , Percent	6.0 & 10 V	10	15 & 20 V	8	25 & 35 V	6
Rated Voltage	Tan δ , Percent											
6.0 & 10 V	10											
15 & 20 V	8											
25 & 35 V	6											
e)	Leakage current	8.3.1	—	Leakage current shall not exceed 0.02 $\mu\text{A}/\mu\text{F}\cdot\text{V}$ or 1 μA whichever is greater								
f)	Voltage proof	8.3.4	—	There shall be no breakdown or flash-over								
g)	Insulation resistance	8.3.5	—	Insulation resistance shall not be less than 100 M Ω								
h)	Sealing	8.4.10	—	There shall be no leakage of electrolyte and bubbling of gas when fully immersed in the solution								
ii)	First Group											
a)	Solderability	8.4.4	—	The tinning shall be uniform and good								
b)	Robustness of terminations	8.4.3	—	—								
1)	Visual examination	8.4.1	—	There shall be no damage								

(Continued)

TABLE 3 TEST SCHEDULE AND REQUIREMENTS — Contd

SI No.	Test	Clause Ref in IS : 8507 (Part I) - 1977	Condition of Test	Requirement								
(1)	(2)	(3)	(4)	(5)								
c)	Bump	8.4.6	4000,400 m/s ²	—								
	1) Visual examination	8.4.1	—	There shall be no damage								
	2) Capacitance	8.3.2	—	Change in capacitance value shall not exceed ± 8 percent								
	3) Tangent of loss angle	8.3.3	—	The value shall not exceed: <table><tr><td>Rated Voltage</td><td>Tan δ, Percent</td></tr><tr><td>6.0 & 10 V</td><td>15</td></tr><tr><td>15 & 20 V</td><td>12</td></tr><tr><td>25 & 35 V</td><td>9</td></tr></table>	Rated Voltage	Tan δ , Percent	6.0 & 10 V	15	15 & 20 V	12	25 & 35 V	9
Rated Voltage	Tan δ , Percent											
6.0 & 10 V	15											
15 & 20 V	12											
25 & 35 V	9											
	4) Leakage current	8.3.1	—	Leakage current shall not exceed 0.04 $\mu\text{A}/\mu\text{F-V}$ or 2 μA whichever is greater								
d)	Vibration	8.4.5	10-2 000 Hz 100 m/s ² , 3 $\times$ 3 h.	—								
	1) Visual examination	8.4.1	—	There shall be no damage								
	2) Capacitance	8.3.2	—	Change in capacitance value shall not exceed ± 8 percent								
	3) Tangent of loss angle	8.3.3	—	As in (ii) (c) (3)								
	4) Leakage current	8.3.1	—	Leakage current shall not exceed 0.04 $\mu\text{A}/\mu\text{F-V}$ or 2 μA whichever is greater								
e)	Shock	8.4.7	—	—								
	1) Visual examination	8.4.1	—	There shall be no damage								
	2) Capacitance	8.3.2	—	Capacitance value shall not exceed ± 8 percent								
	3) Tangent of loss angle	8.3.3	—	The value shall not exceed: As in (ii) (c) (3)								
	4) Leakage current	8.3.1	—	As in (ii) (c) (4)								
	Acceleration (steady state	8.4.8	1 km/s ² rigidly mounted using brackets	—								
	1) Visual examination	8.4.1	—	There shall be no damage								
	2) Capacitance	8.3.2	—	Change in capacitance value shall not exceed ± 8 percent								
	3) Tangent of loss angle	8.3.3	—	As in (ii) (c) (3)								
	4) Leakage current	8.3.1	—	As in (ii) (c) (4)								
g)	Rapid change of temperature	8.5.3	—	—								
	1) Visual examination	8.4.1	—	There shall be no damage								
	2) Capacitance	8.3.2	—	Change in capacitance value shall not exceed ± 8 percent								
	3) Tangent of loss angle	8.3.3	—	As in (ii) (c) (3)								
	4) Leakage current	8.3.1	—	As in (ii) (c) (4)								
h)	Climatic sequence	8.5.1	—	—								
	1) Dry heat	8.5.1.2	At maximum category temperature ($\pm 85^{\circ}\text{C}$) for 16 h	—								
	2) Damp heat (accelerated) First cycle	8.5.1.3	—	—								
	i) Visual examination	8.4.1	—	There shall be no damage								

(Continued)

TABLE 3 TEST SCHEDULE AND REQUIREMENTS — *Contd*

Sl No.	Test	Clause Ref in IS : 8507 (Part I) 1977	Condition of Test	Requirement								
(1)	(2)	(3)	(4)	(5)								
	3) Cold *	8.5.1.4	At minimum category temperature (-55°C) for 2 h	—								
	i) Visual examination	8.4.1	—	There shall be no damage								
	4) Low air pressure	8.5.1.5	2 kPa	There shall be no short circuit								
	5) Damp heat (accelerated) remaining cycles	8.5.1.6	—	—								
	i) Visual examination	8.4.1	—	There shall be no damage								
	ii) Voltage proof	8.3.4	—	There shall be no breakdown or flash- over								
	iii) Insulation resistance	8.3.5	—	100 M Ω , Min								
	iv) Capacitance	8.3.2	—	Change in capacitance value shall not exceed $\pm$ 8 percent								
	v) Tangent of loss angle	8.3.3	—	As in (ii) (c) (3)								
	vi) Leakage current	8.3.1	—	As in (ii) (c) (4)								
iii)	Second Group											
	a) Damp heat (long term)	8.5.2	To one half of the specimens rated voltage shall be applied	—								
	1) Visual examination	8.4.1	—	There shall be no damage								
	2) Voltage proof	8.3.4	—	There shall be no breakdown or flash- over								
	3) Insulation resistance	8.3.5	—	100 M Ω , Min								
	4) Capacitance	8.3.2	—	Change in capacitance value shall not exceed $\pm$ 8 percent								
	5) Tangent of loss angle	8.3.3	—	As in (ii) (c) (3)								
	6) Leakage current	8.3.1	—	As in (ii) (c) (4)								
iv)	Third Group											
	a) Endurance	8.7	—	—								
	1) Visual examination	8.4.1	—	There shall be no damage								
	2) Capacitance	8.3.2	—	Change in capacitance value shall not exceed $\pm$ 15 percent								
	3) Tangent of loss angle	8.3.3	—	The value shall not exceed:								
				<table><tr><td>Rated Voltage</td><td>Tan δ, Percent</td></tr><tr><td>6.0 & 10 V</td><td>20</td></tr><tr><td>15 & 20 V</td><td>16</td></tr><tr><td>25 & 35 V</td><td>12</td></tr></table>	Rated Voltage	Tan δ , Percent	6.0 & 10 V	20	15 & 20 V	16	25 & 35 V	12
Rated Voltage	Tan δ , Percent											
6.0 & 10 V	20											
15 & 20 V	16											
25 & 35 V	12											
	4) Leakage current	8.3.1	—	Leakage current shall not exceed 0.03 $\mu\text{A}/\mu\text{F-V}$ or 1.5 μA whichever is greater								
	5) Voltage proof	8.3.4	—	There shall be no breakdown or flash- over								
v)	Fourth Group											
	a) Mould growth	8.5.5	—	There shall be no mould growth								

*During the last 10 minutes of the period of exposure the rated voltage shall be applied to the specimens. No short circuit shall occur.

(Continued)

TABLE 3 TEST SCHEDULE AND REQUIREMENTS — Contd

SI No.	Test	Clause Ref in IS : 8507 (Part I) - 1977	Condition of Test	Requirement
(1)	(2)	(3)	(4)	(5)
vi)	<i>Fifth Group</i>			
a)	Resistance to soldering heat	8.4.4.2	—	—
i)	Visual examination	8.4.1	—	There shall be no damage
ii)	Capacitance	8.3.2	—	Change in capacitance value shall not exceed ± 5 percent
iii)	Tangent of loss angle	8.3.3	—	As in (ii) (c) (3)
iv)	Leakage current	8.3.1	—	As in (ii) (c) (4)
b)	Resistance to solvents	8.4.9	—	—
i)	Visual examination	8.4.1	—	The marking shall be legible and shall not rub off. There shall be no damage
vii)	<i>Sixth Group</i>			
a)	Characteristics at low and high temperature	8.6	—	—
	<i>Step 1 at 25°C</i>			
1)	Capacitance	8.3.2	—	The capacitance value shall correspond with the rated capacitance taking into account the tolerance
2)	Tangent of loss angle	8.3.3	—	As in (i) (d)
	<i>Step 2 at -55°C</i>			
1)	Capacitance	8.3.2	—	Change in capacitance value shall not exceed ± 12 percent from the value recorded at Step 1
2)	Tangent of loss angle	8.3.3	—	As in (ii) (c) (3)
	<i>Step 3 at 25°C</i>			
1)	Capacitance	8.3.2	—	The value shall not exceed the Step 1 value
2)	Tangent of loss angle	8.3.3	—	As in Step 1
3)	Leakage current	8.3.1	—	This shall not exceed $0.02 \mu A / \mu F \cdot V$ or $1 \mu A$ whichever is greater
	<i>Step 4 at +85°C</i>			
1)	Capacitance	8.3.2	—	Change in capacitance value shall not exceed ± 15 percent
2)	Tangent of loss angle	8.3.3	—	As in (ii) (c) (3)
3)	Leakage current	8.3.1	—	Leakage current shall not exceed 12.5 times the value specified in (i) (e)
b)	Surge	8.8	—	—
1)	Visual examination	8.4.1	—	There shall be no damage
2)	Capacitance	8.3.2	—	Change in capacitance value shall not exceed ± 10 percent
3)	Tangent of loss angle	8.3.3	—	50 percent of the initial limits
4)	Leakage current	8.3.1	—	100 percent of the initial limits
c)	Salt mist	8.5.4	4 days	—
1)	Visual examination	8.4.1	—	There shall be no corrosion or any other damage
2)	Leakage current	8.3.1	—	—